

*Tauschia*, although its other characters fit the latter genus very well. The discovery of *Tauschia Hooveri*, however, ends the supposed geographical isolation of *Hesperogenia* and appears to confirm the desirability of including it under *Tauschia*.

We are glad to have the opportunity to name this remarkable species for Dr. Hoover, whose critical collections and keen observations have been invaluable to us in our work with the Umbelliferae.

Department of Botany,  
University of California, Berkeley,  
November, 1942.

NOTES ON THE FLORA OF THE CHARLESTON  
MOUNTAINS, CLARK COUNTY, NEVADA  
V. CACTACEAE

IRA W. CLOKEY

This treatment of the Cactaceae continues a series devoted to a study of the flora of the Charleston Mountains in southern Nevada and published as follows: Madroño 4: 128-130. 1937; Bull. So. Calif. Acad. Sci. 37: 1-11. 1938; *l.c.* 38: 1-7. 1939; and Madroño 6: 211-222. 1942. I wish to express my thanks to Dr. L. Benson, Dr. E. U. Clover, Mr. Fred Gibson and Dr. Ira L. Wiggins for assistance in the study of the Cactaceae of the Charleston Mountains and for specimens of and information regarding these and related species. Specimens of all of the species treated below except those of *Mammillaria tetrancistra* Engelm. have been widely distributed to the herbaria of the world. Types of the new species are all in the Clokey Herbarium now at the Bull. So. Calif. Acad. Sci. 37: 1-11. 1938; *l.c.* 38: 1-7. 1939; regarding these and related species. Specimens of all the species are in the University of California, Berkeley.

KEY TO THE GENERA OF CACTACEAE

- Stems jointed, cylindrical or flat; leaves small, subulate, deciduous; areoles on tubercles or on flat surfaces, with numerous, barbed glochids; glochids and flowers produced from the same areoles; ovaries with areoles and glochids; spines barbed or not barbed ..... 1. *Opuntia*
- Stems not jointed, cylindrical, without leaves; areoles on ridges or tubercles, without glochids; flowers produced above the areoles; ovaries with or without areoles, without glochids; spines not barbed.
- Stems ribbed; spines borne on definite ridges.
- Flowers borne above old spine-bearing areoles, solitary, appearing lateral, purple or crimson; tube and ovary spiny; fruit colored, thin-skinned, spiny ..... 2. *Echinocereus*
- Flowers borne above young areoles, appearing sub-terminal in a circle near the top of plant; ovary scaly; fruit green, without spines ..... 3. *Echinocactus*
- Stems not ribbed; spines borne on tubercles arranged in rows or scattered.

- Flowers lateral; tubercles not grooved on upper side; one or more of the spines hooked; fruit red; seeds black, rugose, with a thick corky base in our species ..... 4. *Mammillaria*
- Flowers terminal; tubercles grooved on upper side; none of the spines hooked; fruit green or rose, ripening slowly; seeds brown, pitted, without a thick corky base ..... 5. *Coryphantha*

## KEY TO THE SPECIES OF OPUNTIA MILL.

- Joints cylindrical and tuberculate.
- Spines smooth, covered with loose, hyaline sheaths.
- Stem slender and solid, with a woody axis; tubercles flattened; spines solitary or absent ..... 1. *O. ramosissima*
- Stems thick and fleshy with a reticulated, cylindrical axis; tubercles raised; spines more than one.
- Tubercles two to three times as long as wide; fruit dry, with stout spines ..... 2. *O. acanthocarpa*
- Tubercles less than twice as long as wide.
- Plants erect, with one or few main stems; stems loosely branched; flowers yellow, tinged with red; fruit dry, with stiff spines on the upper areoles ..... 3. *O. echinocarpa*
- Plants low, bushy, without a main stem; stems compactly short branched; flowers greenish-yellow; fruit somewhat fleshy, yellow, with a few delicate, deciduous spines .... 4. *O. multigeniculata*
- Spines rough, without sheaths; plants prostrate .... 5. *O. Parishii*
- Joints flattened, not tuberculate.
- Joints spineless; flowers magenta; fruit dry, spineless ..... 6. *O. basilaris*
- Joints spiny; flowers yellow.
- Areoles 2-3 cm. apart; spines white or with brown base; fruit purple, juicy, spineless.
- Fruit 3-3.5 cm. long, with green pulp; slopes above Griffith's mine at an elevation of 2450 meters ..... 7. *O. charlestonensis*
- Fruit 4-6 cm. long, with purple pulp; at elevations of 1200-1350 meters ..... 8. *O. phaeacantha*
- Areoles about 1 cm. apart; spines white (occasionally brownish); fruit dry, spiny.
- Spines acicular, 3-5 cm. long and bristle-like, up to 12 cm. long ..... 9. *O. erinacea*
- Spines all acicular, stiff, not over 2-3 cm. long .. 10. *O. polyacantha*

1. *OPUNTIA RAMOSISSIMA* Engelm. Am. Jour. Sci. ser. 2, 14: 339. 1852.

Mohave and Colorado deserts, from California, Nevada and Arizona south to Sonora. Local habitat, widely scattered in sandy or gravelly soil in the Larrea Belt. Best developed in sandy soil east of Wilson's ranch where the plants are about one-half meter tall. Cottonwood Springs, altitude 1030 meters, *Clokey 8036*; E-Spear ranch, altitude 1640 meters, *Train 1743*; south of Indian Springs, altitude 1200 meters, *Clokey 8026*; east of Wilson's ranch, altitude 1100 meters, *Clokey 8437*. May to August.

2. *OPUNTIA ACANTHOCARPA* Engelm. & Bigel. Proc. Am. Acad. 3: 308. 1856.

Mohave and Colorado deserts from California to southern Utah, south to Sonora. Local habitat, in sandy or gravelly soil in the Larrea Belt. Most abundant at Wilson's ranch. Wilson's ranch, altitude 1150 meters, *Clokey 8024, 8433*. June.

3. *OPUNTIA ECHINOCARPA* Engelm. & Bigel. Proc. Am. Acad. 3: 305. 1856.

Mohave and Colorado deserts of California, east to Utah and Arizona, south to Lower California. Local habitat, local in the upper Larrea and lower Juniper belts. Most abundant in Kyle Canyon at an elevation of about 1600 meters. Kyle Canyon, *Clokey 7202, 8025*. June.

4. *Opuntia multigeniculata* Clokey sp. nov. E Sect. *Cylindropuntia*, *humilis*, *subadscendens*, *habitu conferta*, plus minusve 0.5 m. alta, ad 1.5 m. lata, ramorum ligno debili, reticulato; ramis majoribus depresso-tuberculatis, ca. 1.5–2 cm. crassis, geniculis lateralibus numerosis, 3–5 cm. longis, ca. 2 cm. crassis, tuberculis confertis 4–6 mm. longis, 2–3 mm. latis, 4–5 mm. altis, apice areola pallide brunneo-lanosa, 4–5 mm. longa, 2–2.5 mm. lata coronatis; aculeis ca. 12, geniculum ipsum fere occultantibus, delicatis, vaginis albidis barbulatis; aculeis centralibus 2–4, 15–18 cm. longis, lateralibus gracillimis; foliis teretibus apiculatis ca. 2 mm. longis; glochidiis ex areola summa albidis, 1.5 mm. longis; floribus in apice geniculi aggregatis, ca. 2.5 cm. longis totidemque latis; ovario conferte tuberculato, areolis prominentibus, ellipsoideis, lana pallide brunnea; aculeis paucis, pergracilibus, deciduis; perianthii laciniis pallide viridi-luteis, spatulatis, obtusis apiculatisve, 15–18 mm. longis; stylo cum stigmatibus luteis, stigmatum lobis 6–8; staminibus luteis; fructu globoso, luteo, subcarnoso, ca. 2 cm. longo, tuberculato, exaculeato, profunde umbilicato; hypanthii cavo pulpa incolora farcto; seminibus rotundatis, pallide luteis, haud nitidis, levibus, 2.5–3 mm. diametientibus, commissura brevi, lata, manifesta.

A low, semi-ascending, compact *Cylindropuntia*, 0.5 m. or less high, up to 1.5 m. wide, with stems having a weak, reticulated, woody framework; main stems low tuberculate, about 1.5–2 cm. thick, with crowded lateral joints 3–5 cm. long, about 2 cm. thick; lateral joints with closely placed tubercles, 4–6 mm. long, 2–3 mm. wide, 4–5 mm. high, with the entire upper end of the tubercle occupied by an areole 4–5 mm. long, 2–2.5 mm. wide, filled with light tan-colored wool; spines about 12, almost concealing the surface of the joints, delicate, white-sheathed, barbed; 2 to 4 central spines 15–18 mm. long; lateral spines very slender; leaves terete, apiculate, about 2 mm. long; glochids white, 1.5 mm. long, from the upper end of the areoles; flowers clustered at the tip

of the joints, about 2.5 cm. long and broad; ovary closely tuberculate; areoles prominent, oval, filled with light tan-colored wool; spines few, very delicate, deciduous; perianth-segments light greenish-yellow (Ridgway's Col. Stand. and Nom. plate 5, 25 YG-Y, b), spatulate, obtuse or apiculate, 15-18 mm. long; style and stigmas yellow; stigma lobes 6 to 8; stamens yellow; fruit globose, yellow, with somewhat fleshy walls, about 2 cm. high, tuberculate, spineless, deeply umbilicate; seed cavity filled with colorless jelly; seeds circular, light yellow, dull, smooth, 2.5-3 mm. in diameter; commissure short, broad, distinct.

Definitely known only from the type locality on an open, rocky ridge east of Wilson's ranch, Charleston Mountains, Clark County, Nevada, along road from Blue Diamond mill to the mine, at an elevation of 1400 meters; *Clokey 8430* (type), *8639, 8760*. Flower, May; fruit, July to September.

Mr. Fred Gibson of the Boyce Thompson Southwestern Arboretum states that plants similar to this are found near Prescott, at Congress, and along the Colorado River in Arizona. These have not been examined.

*Opuntia multigeniculata* is intermediate between the series Thurberianae and Echinocarpae. In the Echinocarpae it is closest to *O. echinocarpa* Engelm. & Bigel. It differs from this species in having weaker, less woody, shorter and more crowded stems. The fruit of *O. echinocarpa* is dry. The somewhat fleshy fruit and the seeds resemble *O. Whipplei* Engelm. & Bigel. The joints, however, are thicker, shorter, more crowded and more thickly armed than *O. Whipplei*. In the original description Engelm. and Bigelow (Proc. Am. Acad. 3: 307. 1856), state that the color of the flowers of *O. Whipplei* is red. Britton and Rose (Cact. 1: 55-56. 1919) and Benson and Thornber (Cact. Ariz. 36. 1940) give the color of the flowers as yellow.

Neither *O. echinocarpa* nor *O. Whipplei* grow near the type locality of *O. multigeniculata*.

##### 5. OPUNTIA PARISHII Orcutt, West. Am. Sci. 10: 81. 1896.

Mohave Desert of California and southern Nevada. Local habitat, locally abundant in sand or gravelly soil in the Larrea Belt at elevations of 1000 to 1200 meters. Cottonwood Springs, *Clokey 8028*; south of Indian Springs, *Clokey 8027*; east of Wilson's ranch, *Clokey 8434*. June.

Drifting sand usually partially covers the old joints. This is a characteristic plant that could not be mistaken for any other *Cylindropuntia* in this region.

---

#### EXPLANATION OF THE FIGURES, PLATE 4.

PLATE 4. CACTACEAE OF THE CHARLESTON MOUNTAINS, NEVADA. Fig. A, *Opuntia multigeniculata* Clokey. Fig. B, *Opuntia acanthocarpa* Engelm. and Bigel. Fig. C, *Opuntia charlestonensis* Clokey.

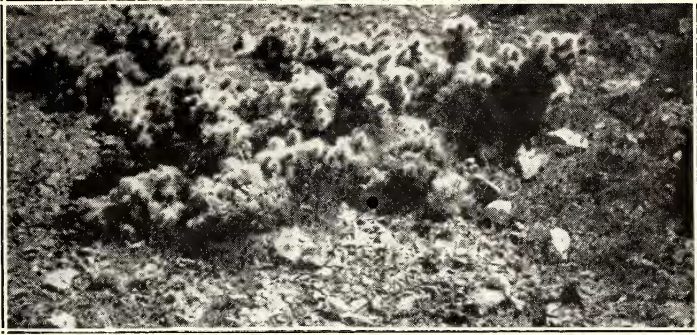


FIGURE A



FIGURE B



FIGURE C

PLATE 4. CACTACEAE OF THE CHARLESTON MOUNTAINS, NEVADA.



6. *OPUNTIA BASILARIS* Engelm. & Bigel. Proc. Am. Acad. 3: 298. 1856.

Colorado and Mohave Deserts and surrounding mountains from California to Utah, south to Sonora. Local habitat, widely scattered in the Larrea Belt below 2000 meters. Clark Canyon, *Clokey & Anderson 7201*; southeast Indian Springs, *Train 1759*; Kyle Canyon, *Clokey 7205, 8032*; Trout Creek Canyon, *Clokey & Anderson 7206*. May.

7. *Opuntia charlestonensis* Clokey sp. nov. Humilis, patens ad 0.5 m. alta, 1.5 m. lata, ramis primo adscendentibus demum prostratis, tum geniculis 2-3 junioribus tantum suberectis; geniculis apicalibus vel lateralibus, ovalibus vel obovatis, saepius apice rotundatis, 10-18 cm. longis, 10-12 cm. latis, viridi-lutescentibus, primo vere rubentibus; areolis rotundatis vel ovatis, 5-6 mm. latis, 2-2.5 cm. distantibus; glochidiis 3-4 mm. longis, pallide brunneis in areolae apice; aculeis 4-6 acicularibus longitudine ludentibus, longissimis ad 4.5 cm., subcomplanatis tortisque, undique vertentibus, albidis vel albidis basi pallide brunneis; floribus primo laete luteis demum conferte roseis rubro-suffusis, 4-6 cm. longis, ca. 4 cm. latis; perianthii laciniis externis ovatis, acutis, mucronatis, internis ovatis, apice rotundatis saepius mucronatis; staminibus luteis; stylo cum stigmatibus luteis vel rubescentibus; fructu ellipsoideo 3-3.5 cm. longo, 1.5-2 cm. crasso, sordide purpurascente, cortice externo pulpaque viridibus; seminibus appianatis, 4-5 mm. diametentibus.

A low spreading plant up to 0.5 m. high, 1.5 m. wide, the main branches at first ascending, later prostrate with only the younger two to three joints ascending; joints arising from the faces as well as from the edges of older joints, oval or obovate, mostly rounded at tip, 10-18 cm. long, 10-12 cm. wide, yellowish-green, in the spring purplish; areoles circular or oval, 5-6 mm. across, 2-2.5 cm. apart; glochids in the upper part of the areoles, 3-4 mm. long, light brown; spines four to six, acicular, varying in length, the longest up to 4.5 cm. long, somewhat flattened and twisted, spreading in all directions, white or white with light brown base; flowers clear yellow at first, turning salmon tinged with red, 4-6 cm. long, about 4 cm. wide; outer perianth-segments ovate, acute, mucronate; inner segments ovate, rounded at tip, usually mucronate; stamens yellow; style and stigmas yellow or reddish tinged; fruit oval, 3-3.5 cm. long, 1.5-2 cm. thick, dull reddish-purple, with green rind and pulp; seeds flat, 4-5 mm. in diameter.

Known only from hillsides adjacent to Griffith's mine, associated with *Pinus monophylla* Torr. & Frém. and *P. scopulorum* (Engelm.) Lemmon, at an elevation of about 2450 meters, *Clokey 7203, 7592, 8029* (type), *8688, 8770*. Flower, July to August; fruit, September to October.

As suggested by Dr. Ira L. Wiggins, *O. charlestonensis* is most closely related to *O. megacarpa* Griffiths, a plant of the western edges of the Mohave and Colorado deserts in California. *O. megacarpa* has joints 20–30 cm. long, fruit 7–12 cm. long and seeds 7–8 mm. in diameter.

8. *OPUNTIA PHAEACANTHA* Engelm. in Gray, Mem. Am. Acad. 4: 52. 1849.

Texas and Chihuahua to Arizona and the Charleston Mountains, Clark County, Nevada. Local habitat, among *Quercus*, *Fraxinus* and *Amelanchier* at Wilson's ranch and in open wash on gravelly soil at the mouth of Pine Canyon. Wilson's ranch, altitude 1180 meters, *Clokey* 8031, 8424, 8431, 8761; mouth of Pine Canyon, altitude 1350 meters, *Clokey* 8656, 8685. Flower, May to June; fruit, July to August.

The plants of *O. phaeacantha* Engelm. from the Charleston Mountains do not agree entirely with the original description but, except for the size of the fruit, fall well within the range included in that highly variable species by Britton and Rose (Cact. 1: 144. 1919), and Benson and Thornber (Cacti Ariz. 58. 1940). Boissevain and Davidson (Colo. Cacti. 12. 1940) give the size of the fruit as 4 to 6 centimeters in length, which agrees with the fruit of our plants. At Wilson's ranch, where the joints are up to 20 centimeters long, *O. phaeacantha* grows among *Quercus*, *Fraxinus* and *Amelanchier*. This protection may well account for the unusual size of the joints. The red color shown in winter and spring on the joints at Pine Canyon, but not at Wilson's ranch, is evidently due to cold. Cuttings from the Pine Canyon station grown in South Pasadena remain green throughout the winter.

9. *OPUNTIA ERINACEA* Engelm. Proc. Am. Acad. 3: 301. 1856.

Mohave Desert of California, east to Utah and Arizona. Local habitat, most abundant on a dry ridge east of Wilson's ranch along road from Blue Diamond mill to the mine, at an elevation of 1200 to 1400 meters. Mountain Springs, elevation 1700 meters, *Clokey* 8423; ridge east of Wilson's ranch, *Clokey* 8033, 8436. June to July.

10. *OPUNTIA POLYACANTHA* Haworth, Suppl. Succ. 82. 1819.

North Dakota to Washington, south to Texas, Nevada and Arizona. Local habitat, occasional in the Juniper Belt. Harris Springs road, elevation 1800 meters, *Clokey* 7591; Lee Canyon, elevation 1800 meters, *Clokey* 7204; Willow Springs, elevation 1200 meters, *Clokey* 8030.

KEY TO THE SPECIES OF ECHINOCEREUS ENGELM.

- |   |                          |
|---|--------------------------|
| Plants forming large clusters with many heads; spines few, white or gray, long and flexuous; flowers scarlet, funnellform ..... | 1. <i>E. mohavensis</i>  |
| Plants with few heads, ascending; spines white to brown, stout, curved; flowers purple, broad .....                             | 2. <i>E. Engelmannii</i> |



1. *ECHINOCEREUS MOHAVENSIS* (Engelm. & Bigel.) Rümpler, Först. Handb. Cact. 2: 803. 1885.

*Cereus mohavensis* Engelm. & Bigel. in Engelm. Am. Acad. Arts and Sci. Proc. 3: 281. 1856.

Southeastern California to southern Utah, northern Arizona and south to Mexico. Local habitat, occasional as single plants in the Juniper Belt extending in places to the Pinyon and Yellow Pine belts. Grows in gravelly soil and on rock ledges. Cathedral Rock, elevation 2425 meters, *Clokey 7211*; Clark Canyon, elevation 1800 meters, *Clokey & Anderson 7200*; Charleston Park, elevation 2300 meters, *Clokey 8034*, elevation 8000 feet, *Alexander 755*; Kyle Canyon, elevation 2425 meters, *Clokey 7210*, elevation 1700 to 2400 meters, *Clokey 8435*; Lee Canyon, elevation 2670 meters, *Clokey, Clokey & Baker 7597*. May, June.

2. *ECHINOCEREUS ENGELMANNII* (Parry) Rümpler, Först. Handb. Cact. 2: 805. 1885.

*Cereus Engelmannii* Parry ex Engelm. Am. Jour. Sci. ser. 2, 14: 338. 1852.

Mohave and Colorado deserts of California, east to Utah and Arizona, south to Mexico. Local habitat, widely scattered in the Larrea and lower Juniper belts at elevations up to 1400 meters. Kyle Canyon, *Clokey 7590*; Trout Creek Fan, *Clokey 7207*.

#### KEY TO THE SPECIES OF ECHINOCACTUS MILL.

Spines stout, flattened, annulate; flowers yellow.

Stems globose, aggregate; axils of scales of ovary and fruit woolly ..... 1. *E. polycephalus*

Stems simple, globose to cylindrical; axils of scales on ovary and fruit not woolly ..... 2. *E. acanthodes*

Spines subulate, not annulate; scales on ovary and fruit few, without wool in the axils; flowers amaranth purple (Ridgway) to pink ..... 3. *E. Johnsonii*

1. *ECHINOCACTUS POLYCEPHALUS* Engelm. & Bigel. Proc. Am. Acad. 3: 276. 1856.

Eastern Mohave Desert of California, east to Utah and Arizona, south to northern Sonora. Local habitat, sparsely scattered in gravelly soil or on rock ledges in the Larrea Belt. South of Indian Springs, elevation 1300 meters, *Clokey 7598*, elevation 1250 meters, *Clokey 8432*. July.

2. *ECHINOCACTUS ACANTHODES* Lemaire, Cact. Gen. Nov. Sp. 106. 1839.

*Ferocactus acanthodes* (Lemaire) Britton & Rose, Cact. 3: 129. 1922.

Southern California to southern Nevada, Arizona and Lower California. Local habitat, on gravelly hills and rock ledges in the Larrea Belt at elevations of 1100 to 1400 meters. Most abundant on a ridge east of Wilson's ranch along road from Blue

Diamond mill to the mine. South of Indian Springs, *Clokey 7212, 7593*; rocky ridge east of Wilson's ranch, *Clokey 8428, 8429*.

3. *ECHINOCACTUS JOHNSONII* Parry in Engelm. Bot. King's Geol. Expl. 40th Par. 5: 117. 1871.

*Ferocactus Johnsonii* (Parry), Britt. & Rose, Cact. 3: 141. 1922.

Southwestern Utah, northwestern Arizona, southern Nevada and extreme eastern Inyo County, California. Although *Echinocactus Johnsonii* so far has not been found in the Charleston Mountains it is to be expected since it occurs both to the east and to the west of the range. It occurs very locally on hot, steep, gravelly slopes in the Larrea Belt and should be looked for on the lowest foothills. East of the range: Frenchman's mine, 7 miles east of Las Vegas, elevation 630 meters, *Clokey 5900*; ridge south of Logandale, Clark County, elevation 550 meters, *Clokey 5901*. West of the range the type locality of *Echinocactus Johnsonii* Parry var. *octocentrus* Coult. is in the mountains east of Resting Springs, Inyo County, California.

The number of central spines is rather indefinite and variable even on the same plant. The spines graduate in thickness and length from the largest centrals to the shortest laterals so that there is no satisfactory line of demarcation.

#### MAMMILLARIA HAW.

1. *MAMMILLARIA TETRANCISTRA* Engelm. Am. Jour. Sci. ser. 2, 14: 337. 1852.

*Phellosperma tetrancistra* (Engelm.) Britt. & Rose, Cact. 4: 60. 1923.

Southern Utah to Nevada, Arizona and southeastern California. Infrequent and isolated. Local habitat, known in the Charleston Mountains from a single specimen collected on a gravelly hillside in the Larrea Belt south of Indian Springs at an elevation of 1250 meters, *Clokey 8037* (Clokey Herbarium).

#### KEY TO THE SPECIES OF CORYPHANTHA (ENGELM.) LEMAIRE

- |  |                      |
|--|----------------------|
| Flowers 2-3 cm. long, straw-colored with pinkish midrib to tinged with pink throughout; fruit green; seeds brown; Larrea and Juniper belts .....   | 1. <i>C. deserti</i> |
| Flowers 3.5-4.5 cm. long, eugenia red to old rose (Ridgway); fruit more or less rose-colored; seeds reddish-brown; associated with <i>Pinus monophylla</i> Torr. & Frem., <i>P. scopulorum</i> (Engelm.) Lemmon and <i>Cercocarpus ledifolius</i> Nutt. .... | 2. <i>C. rosea</i>   |

#### EXPLANATION OF THE FIGURES, PLATE 5.

PLATE 5. CACTACEAE OF THE CHARLESTON MOUNTAINS, NEVADA. Figs. a, b, *Opuntia acanthocarpa* Engelm. and Bigel. Figs. c, d, *Opuntia echinocarpa* Engelm. and Bigel. Figs. e, f, g, *Opuntia multigeniculata* Clokey. Fig. h, *Opuntia echinocarpa* Engelm. and Bigel. Fig. i, *Coryphantha rosea* Clokey.